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THE GENUS *ASCIA* IN THE ANTILLES (LEPIDOPTERA, PIERIDAE)

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The genus *Ascia*, in a broad sense, is considered to contain two species occurring in the Antilles. The present status of these species seems to be confused taxonomically, and my present purpose is to present a more reasonable arrangement of these species and their subspecies.

Ascia monuste monuste (Linnaeus)

Surinam

Papilio monuste LINNAEUS, 1764, p. 237.

There has been some discussion as to whether the name *monuste* should refer to an American or an Asiatic species.

Linnaeus described *Papilio monuste* in his division of the "Danai candidi" and made a second reference to it (1767, p. 760), giving the locality, "Habitat in Barbaria."

Müller (1774, p. 589) called *monuste*, "Der barbarische Weissling" and said that it came from "Barbarey," apparently following Linnaeus.

Fabricius (1775, p. 470) was the first reviser. He cited Kleemann (1761, p. 31, Pl. III, fig. 3) who gave an excellent but unnamed figure of the upperside of a male of *monuste* such as occurs in the Guianas. Fabricius gave "Habitat in America" and remarked that the underside of the hindwing was yellow, which is a character more evident in the Antillean than in the continental populations of the species. Nevertheless his characterization is sufficient to fix *monuste* as an American species. However, various subsequent authors have had conflicting views.

Cramer (1777, II, p. 71, Pl. CXLI, fig. F) called the species *monusta*, said that both surfaces were alike and that it was found in China, gave the Linnean (1767) and the Kleemann references and figured the upperside of a male which agrees with specimens

from the Guianas, although it is not so heavily marked as the specimen figured by Kleemann.

Gmelin (1790, p. 2262) concurred with Fabricius, giving additional references.

Hübner (1808, Sammlung, I, Pl. CXXXVII, figs. 1, 2, males; 3, 4, females) figured *Mancipium Vorax monuste* without locality. These figures show heavily marked specimens with a strong ochre coloring on the underside.

Latreille (1819, p. 141) gave a description which agrees with some of the male specimens from the Guianas but said that the species was found in China and asserted that Fabricius was in error in selecting a species from America with the underside of the hindwing yellow.

Boisduval (1836, p. 495) considered *monuste* to be an American species.

Aurivillius (1882, p. 51) stated that the type of *monuste* was not in the Museum Ludovicae Ulricaе, and Jackson (1913) did not list it in the collection of the Linnean Society of London, nor in other collections containing Linnean specimens. The type is presumably lost. Aurivillius gave his conception of *monuste* when he defined as "fig. typicae" those of Hübner.

Talbot (1929, p. 52) applied *monuste* to a Sumatran butterfly, described as *cynis* Hewitson (1866), and used the name *phileta* Fabricius (1775) for the American species. Later Talbot (1932, p. 207) apparently reversed his opinion, for he accepted *monuste* as the genotype of *Ascia* and as the stem name of various American subspecies and forms.

Holland (1930, p. 133; 1931a, p. 278) considered *monuste* to be an American species.

The Linnean description, when carefully read, defines a butterfly which is of

common continental American occurrence. The forewings are white with the apex, costa and outer margin fuscous; the hindwings are white with only the outer margin "denticulato-fuscus"; the underside is of like color, but in place of the fuscous, only dusky at the margin. Males from Surinam, or generally from northern South America, are such as Linnaeus described, and he is known to have obtained specimens of other species from Surinam. The evidence provided by the original description, the opinion of Fabricius as first reviser, the figures of Kleemann and Cramer and the likelihood that the type specimen of *monuste* came from Surinam, all support the belief that the name *monuste* is properly applied to an American species and even more definitely to the particular form which occurs in Surinam and that this locality may be fixed as the type locality of *monuste*.

The series of *monuste* in the collection of The American Museum of Natural History consists of over 600 specimens from many localities in South, Central and North America and the West Indies. This butterfly is a notable migrant, as stated by Williams (1930, p. 126), and this habit may account for a mingling of populations in the Antilles. In examining specimens from any particular insular region the possibility of the influx of foreign elements and of the interbreeding of various strains must be considered, and it would not be safe to reach positive conclusions as to the existence of stable geographical subspecies unless much larger series of specimens than are now available from reasonably segregated populations could be examined. Further, much more information is needed about the nature of migrations and the possible effects of immigrants upon invaded populations.

As an example, the variation observed in a small sample from one population, a series of about 100 specimens from Puerto Rico, suggests extensive hybridization. Great variation, which apparently is not seasonal, is to be seen in both sexes. The marginal black-brown markings range in intensity from a narrow apical edging of the forewing to a strongly dentate border

of the forewing with marginal spots developed on the hindwing at the veins. The coloration of the underside ranges from pale cream-white to bright ochre, sometimes with considerable brown marking. The series in both sexes shows connected intergradation between the extremes, but these extremes, if considered alone, are sufficiently different in both sexes to suggest two separate species. A different picture is presented by a series of thirty-four specimens from Dominica, British West Indies, for the most part captured in November and December but showing no seasonal separation from others in the series taken in January, April, September and October. In this sample two extremes appear: nineteen males and nine females of the light-bordered kind which, in a few specimens, show a slight increase in the width of the forewing border; five males and one female of the broadly bordered kind; both kinds have the apex of the forewing and the entire hindwing on the underside ochre but many narrow-bordered individuals are pale, while all broad-bordered specimens are strongly ochre colored. If the Dominican sample was considered alone, the difference in the facies of the two forms is so marked that it is certain that almost any taxonomist, without other information, would regard them as two species.

Several preparations made of the male genitalia of both kinds from Puerto Rico and from Dominica showed some very slight variation, but as this appeared even between specimens having the same coloration and pattern, it is considered to be individual. The preparations agreed with the figure of the *monuste* genitalia given by Klots (1933, Pl. XII, fig. 95). I do not consider that similarity of the genitalia is necessarily a proof that the two forms examined are not specifically distinct. There are many cases known where the male genital armatures are similar in several species which are distinct in pattern.

There is a doubt in my mind as to whether the narrow-bordered and broad-bordered forms above referred to are distinct species or subspecies of one species.

There is evidence in another migratory species that subspecies may occur together under similar conditions. The North American "Monarch," *Danaus plexippus*, is known to migrate far to the south and has been captured in Puerto Rico where there exists the very distinct (probably largely sedentary) subspecific population of *Danaus plexippus portoricensis* Clark.

In examining the various populations of *monuste* in the Antilles (including Florida) there is a definite suggestion of underlying subspecific populations marked to a greater or lesser degree, despite what appears to me to be a general blending of the populations suppositively caused by migrations. Based on the material available and with a full realization that my knowledge of it is entirely morphological I now offer some suggestions which I hope may be of aid in understanding the taxonomy of *monuste*.

I would first separate the Antillean populations of *monuste* as a whole from the continental populations in a broad way by the underside coloring. In addition I would recognize two well-marked variant populations. These three I would classify for the present as subspecies.

***Ascia monuste eubotea* (Latreille)**

Antilles

Pieris eubotea LATREILLE, 1819, IX, p. 144.

Pieris eubotea, BOISDUVAL, 1836, p. 500.

Latreille described *eubotea* as a species without locality, but Boisduval associated it with the female of *monuste*. The description said that the upperside had dentate or crenulate borders on both wings and that the underside of the hindwing was yellow-ochre. Such females are not uncommon in the Antilles, often lacking the blackish spot at the end of the cell on the forewings.

For the present I suggest the use of the name *eubotea* for the most commonly occurring manifestation of *monuste* in the Antilles. The extent of the marginal markings of the upperside is variable, but this margin is consistently dentate basad. The underside of the forewing usually has a distinct yellow apical area, and the hindwing is entirely yellow on the underside;

the intensity of this coloring is highly variable, brown markings occur occasionally, but usually the surfaces are plainly yellow, and the veins are not outlined in brown.

With an increased knowledge of *monuste* in the Antilles it might be possible to restrict the name *eubotea* to a definite population. My use of the name for a composite group of populations which have principal characters in common is tentative as a temporary aid in classification.

***Ascia monuste phileta* (Fabricius)**

Florida

Papilio phileta FABRICIUS, 1775, p. 471.

The population of *monuste* in Florida is quite distinctive in that the males are usually lightly bordered with black-brown on the forewing, lack marginal marks at the veins of the hindwing and are usually palely colored on the underside. The females occur not infrequently with a dark smoky coloring on both sides of the wings, but this kind intergrades to a normal whitish female. The name *phileta* has been applied to the dark female as a dimorphic form name. Fabricius described *Papilio phileta* as related to *monuste*, giving the habitat as America. Although duskiness of the females is not exclusively confined to the Floridian population, it certainly appears more frequently in that population than in others and to an extent to warrant its use as a subspecific character. Considering the differentiation occurring in both sexes of Floridian specimens, I suggest that this population should be recognized as a separate subspecies, *Ascia monuste phileta* (Fabricius). In a series of seventy specimens from Florida there is no well-defined example of the generally distributed Antillean subspecies *eubotea*. Holland (1931a, p. 278, Pl. LXVII, figs. 15, 16) comments upon and figures a pair taken in copula which are representative of *monuste phileta*.

Talbot (1932, p. 208) lists *Ascia monuste cleomes* (Boisduval and LeConte) from southern United States. This is an interesting form, about which there seems to be little information, but I believe that Talbot has properly recognized it. A

single male from Virginia, No. 3935 of the Henry Edwards collection, determined by Edwards as "*cleomes* Bdv. and L.," agrees with the original description and figures. This is a *monuste* of the continental type with brown veins on the underside of the hindwing, but it is distinguishable from Mexican and Central American specimens. It is also distinct from *phileta* which is of the Antillean type. The name *cleomes* appears in North American lists as a synonym of *monuste*. I suggest that it might be properly applied to a subspecies with a more northern range than *phileta*, but a study of more material is obviously needed.

Ascia monuste virginia (Latreille)

Antilles

Pieris virginia LATREILLE, 1819, IX, p. 141.

Mylothris hemitheia GEYER, 1832, Zuträge, IV, p. 24, Figs. 693, 694.

Latreille described *virginia* without a locality, but Boisduval (1836, p. 494) gave the locality as the Antilles. As described, this is a form with a very narrow costal and outer-marginal bordering of dark brown in the forewing and otherwise immaculate on the upperside. On the underside, the apex of the forewing and the entire hindwing are plainly ochre-yellow. In a series of fifty specimens from the Virgin Islands 40 per cent might be considered to qualify as *virginia*. The narrow-bordered females are particularly significant. However, 60 per cent of the series I would consider to be *monuste eubotea*. Males and females which would qualify as *virginia* occur in decreasing numbers among populations of *monuste eubotea* in Puerto Rico and Jamaica. In a series of eighty-five specimens from Hispaniola none appears.

In St. Kitts, Antigua and Dominica, *virginia* seems to be the prevalent form. In a series of thirty-four specimens from Dominica, twenty-eight specimens (over 80 per cent) qualify as *virginia*. This form also appears in Guadeloupe and St. Lucia, but the material is insufficient to draw any conclusions from these localities.

Summarizing the evidence on *virginia*, it would seem that in the Virgin and Lee-

ward Islands there is a variant form which may be recognized as *Ascia monuste virginia* (Latreille). The evidence is that it occurs (perhaps as a migrant) both to the north and south and that its region is invaded from both directions (perhaps through migrations) by the more widespread forms, *monuste eubotea* and *monuste monuste*.

In one category or another, Talbot (1932, p. 207) lists eighteen names for *monuste*. Some of these names appear to represent good continental subspecies such as *raza* Klots from Lower California and *automate* Burmeister from the Argentine. Talbot lists the remaining names variously as subspecies, forms and synonyms. Boisduval (1836, pp. 493-495) described *evonima*, *vallei* and *joppe* from Cuba, all of which can be selected from a good Cuban series of *monuste eubotea*, according to Bates (1935, p. 116) who discussed *monuste* under the name *phileta*. At present, I include these Boisduval names as synonyms of *eubotea*, but the first one might well be used to name a Cuban race when sufficient knowledge of that population is available.

It seems quite possible that with sufficient material and an increased knowledge of the life histories, a series of insular subspecies of *monuste* might be shown to exist for which, incidentally, there is a sufficiency of names available in the synonymy.

As previously indicated *monuste monuste* invades the Windward Islands from South America. Further, some males taken in Hispaniola are apparently *monuste monuste*, being inseparable in appearance from specimens occurring in Central America. Holland (1931, p. 256; 1931a, p. 278, Pl. LXVII, fig. 17) described and figured a form from Florida, applying the "varietal or subspecific name *crameri*." As the form is described and figured this name is a synonym of *monuste monuste*. Its occurrence in Florida would be no more remarkable than in Hispaniola, but I have never seen specimens from Florida.

Life history information concerning *monuste* is scant. Gundlach gave a description of the larva and pupa as occurring in Cuba. Cotton (1918, p. 281, Figs. 37, 38) presented further informa-

tion. The half-dozen food plants mentioned in the literature include various species of *Brassica*, plants of the Chicory and Caper families and *Tropaeolum* (*Nasturtium*). Breeding in quantity might repay the investigator.

The second species known from the Antilles is classified in the subgenus *Ganyra*. It is also polytypic and has a varied distribution.

The combination *Papilio amaryllis* was first used by Cramer (1784, IV, p. 210, Pl. cccxci, figs. A, B) for a Palearctic species in the Satyridae. Fourcroy (1785, II, p. 240) and Borkhausen (1788, I, p. 80), at later dates, separately used the same combination to rename another satyrid but both of these christenings fall as synonyms as well as homonyms. Still later Fabricius used the combination, creating another homonym, but this time the name was used for a pierid, which is recognized as *Ascia amaryllis* (Fabricius) (1793, p. 189) or placed in a subgenus as *Ascia (Ganyra) amaryllis*. The condition is unfortunate, for according to the code a homonym is permanently defunct and *amaryllis* cannot be used for the stem name of the species, nor as the genotype of *Ganyra*.

There are three Antillean forms occurring, respectively, in Jamaica, Hispaniola and Puerto Rico, and another in Central America, which are now listed as subspecies under the stem name of *Ascia amaryllis* (Fabricius) by Talbot (1932, p. 211). These forms are sufficiently distinct in facies to be readily separated, but for three of the subspecies examined there appears to be no genitalic difference in the males. Therefore it seems correct to consider this butterfly as one species divided into four geographical subspecies. Thus the problem becomes taxonomic, that is, to name correctly these subspecies.

***Ascia (Ganyra) josephina josephina*
(Latreille)**

Hispaniola

Pieris josephina LATREILLE, 1819, p. 158.

Ascia josephina, HEMMING, 1934, p. 194.

Succeeding the homonym *amaryllis*, the next available name which may be used as a stem name is *josephina* Latreille,

which was described without locality. Latreille stated, however, that the specimens belonged to M. Dufresne, and Grimshaw (1900, p. 6) discovered types (male and female) in the Dufresne collection in the Edinburgh Museum of Science and Art. Grimshaw said of *josephina*, "This species, which comes from St. Domingo and Mexico, is quite distinct from *P. amaryllis*, Fab., which is a native of Jamaica." I recognize *josephina* as the subspecies occurring in Hispaniola.

***Ascia (Ganyra) josephina paramaryllis*,
new name
Jamaica**

The identity of *Papilio amaryllis* Fabricius is established by the original description. Donovan (1800, Pl. xxviii, fig. 1) figured it, possibly from the type. Fabricius states that his specimen was in the collection of Dr. Hunter, and the type may still exist in the collection of the University of Glasgow. Grimshaw's determination of this subspecies as that one which occurs in Jamaica is now generally accepted.

***Ascia (Ganyra) josephina josepha*
Salvin and Godman**

Guatemala, Mexico, Nicaragua

Pieris josepha SALVIN AND GODMAN, 1868, p. 150. Guatemala.

Salvin and Godman differentiated the Central American subspecies under the name *josepha*. The two names proposed by Fruhstorfer (1907, p. 139), *gervasia* and *protasia*, are synonyms. Such individual variants as he most briefly described are to be found in any good series of specimens. There is a connected intergradation between the light and dark females.

***Ascia (Ganyra) josephina krugii*
(Dewitz)**

Puerto Rico

Pieris josephina var. *krugii* DEWITZ, 1877, p. 235, Pl. I, fig. 3.

Although I have not seen specimens, *krugii* appears, from the description and figure, to be a distinct subspecies.

At present there is no subspecies of *josephina* recognized from Cuba. There

is, however, *Pieris menciae* Ramsden (1915, p. 15) which appears from the description to be very closely related to *josephina paramaryllis*, differing notably only in the absence of the black spot at the end of the forewing cell. Like other subspecies of *josephina*, the males of *mentiae*

have the principal veins of the forewing and to some extent the veins of the hindwing overlaid with chalk-white scales. Not having examined specimens of *mentiae*, I cannot make a definite statement, but it seems quite possible that this is the Cuban subspecies of *josephina*.

KEY TO SUBSPECIES OF *Ascia (Ganyra) josephina*

- 1.—Length of forewing usually less than 35 mm.; black spot at distal end of forewing cell narrow, not more than 1 mm. wide.....2.
 Length of forewing usually more than 35 mm.; black spot at distal end of forewing cell broad, at least 1.75 mm. wide.....3.
- 2.—Male and female immaculate white except for a spot at distal end of forewing cell. (Jamaica).....*paramaryllis*.
 Female with dark spots along veins M_3 and Cu_1 of forewing on upperside; male and female with traces of a black bar beyond distal end of hindwing cell. (Puerto Rico).....*krugii*.
- 3.—Forewing falcate, outer margin concave from M_1 to Cu_2 ; hindwing margin angulate at M_3 ; vein M_3 of hindwing longer from base to apex than distance from its base to base of R_s . (Hispaniola).....*josephina*.
 Forewing not falcate, outer margin scarcely concave; vein M_3 of hindwing equal or shorter from base to apex than distance from its base to base of R_s . (Central America).....*josepha*.

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